



May 20, 2010

Intertek Test Report Number: 100085494DET-001
Project Number: G100085494

Mr. Betul Baskaya
AFS BORU SANAYI A.S.
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Dear Mr. Baskaya:

Intertek has completed the evaluation of your Flexible Duct designated ALUAFS.70. Testing was authorized by signed quote #500222445, dated 3/30/2010. Testing was conducted to determine the performance of the product to the relevant standards used for certification of products of this type. The flexible duct construction consists of spirally wound core wire laminated between three layers of aluminum foil and two layers of polyester film adhered together with adhesive. The samples submitted were subjected to the tests noted below and tested in accordance with the methods outlined in the Standard for Factory Made Air Ducts and Air Connectors, (UL 181, 10th Edition, May 24, 2005); Sections 15 and 19. The test samples were received on April 8th 2010, in new condition. The evaluation was performed at Intertek in Livonia, MI on April 25th 2010. The results of these tests are as indicated below.

<u>Tests Completed</u>	<u>Test Date</u>	<u>Section</u>	<u>Pass / Fail</u>
Puncture Test 102mm flex duct	4/25/2010	15	PASS
Puncture Test 356mm flex duct	4/25/2010	15	PASS
Pressure Test 102mm flex duct	4/26/2010	19	PASS

The samples submitted were deemed to be representative of products within the range of 102 mm through 400 mm. Complete results of the tests conducted can be found on the following pages.

This test report concludes the work anticipated in the testing phase of your project; under Intertek Quote No. 500222445. If there are any questions regarding this report please contact the undersigned at 734-591-09161.

Best Regards,

Tested by,

James Curtis
Technician
Intertek Livonia

Reviewed by,

David Vanderlin
Sr. Project Engineer
Intertek, Livonia

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INTERTEK TEST DATA SHEETS

Client: AFS BORU SANAYI
 Job No.: G100085494 Tested By: James Curtis Date: 4/26/2010
 Product: 102mm & 356mm flex duct Engineer: David Vandelin *DV* Date: May 20, 2010
 Model No.: N/A Standard: UL 181, 10th Edition, May 24, 2005
 Sample Control Number: 1,2,3,1A,2A,3A,1B,2B,3B **ORIGINAL TEST DATA**

TESTS TO BE PERFORMED:

<u>Required:</u>	<u>Page:</u>	<u>Section:</u>	<u>Test Description:</u>	<u>Pass/Fail:</u>
(X)	1	N/A	Cover Page	N/A
(X)	2	N/A	Equipment Used	N/A
(X)	3	15	Puncture Test	Pass
(X)	4	19	Pressure Test	Pass

TEST EQUIPMENT (CALIBRATED)

#	ITS No.	Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
1	N/A	Manometer	Omega	2082	4810154748	2/2/10	2/2/11
2	162380	Humidity/Temp Chart	Omega	CT485B-110V-G-AL	NA	1/20/10	1/20/11

TEST EQUIPMENT (UNCALIBRATED)

3	N/A	Puncture test Apparatus	ITS	N/A	N/A	N/A	N/A
4	N/A	Tape Measure	Master tech	N/A	N/A	N/A	N/A

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 Sample Control Number: 1,2,3,1A,2A,3A,1B,2B,3B **ORIGINAL TEST DATA**

Puncture Test: (Section 15)

Pass: X **Fail:**

Test Purpose:
 An air duct shall not be punctured when tested in accordance to the requirements outlined in Section 15 of UL 181.

Test Parameters:
 Three identical samples prepared from untested flexible duct are to be cut into 2 feet lengths and three samples previously subjected to the temperature test. Utilizing the test fixture and procedure as outlined in Section 15 of UL 181, samples are then impacted at three different locations (0, 120, 240 degrees) from a height of 20-inches above top of sample and then examined for rupture or damage

Test Results:				
Description	Test location			Results
	0 degrees	120 degrees	240 degrees	
Untested 102mm diameter Sample #1	No penetration	No penetration	No penetration	Pass
Untested 102mm diameter Sample # 2	No penetration	No penetration	No penetration	Pass
Untested 102mm diameter Sample # 3	No penetration	No penetration	No penetration	Pass
Untested 356mm diameter Sample #1A	No penetration	No penetration	No penetration	Pass
Untested 356mm diameter Sample # 2A	No penetration	No penetration	No penetration	Pass
Untested 356mm diameter Sample # 3A	No penetration	No penetration	No penetration	Pass

To Comply:
 The samples shall prevent the complete penetration through the wall of the sample of the plunger head falling through a distance of 20 inches (508 mm) as measured to the top surface of the sample.

Intertek Comments:

 X The product complies with all applicable requirements of this test.

 The product does not comply with the requirements of this test.

Test Date: 4/26/2010

Tested By: J. Curtis *J. Curtis*

Environmental Conditions During Testing: Humidity: 20% Temperature: 72°F

Equipment Used (See page 2 for details): 2 3 4

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 Sample Control Number: 1,2,3,1A,2A,3A,1B,2B,3B **ORIGINAL TEST DATA**

Pressure Test: (Section 19)

Pass: X Fail:

Test Purpose:
 Air ducts and air connector sections with joints, assembled in accordance with the manufacturer’s instructions, shall withstand without rupture an internal air pressure of 2-1/2 times the manufacturer’s rated positive pressure, and not less than 1-1/4 inch water column (311 Pa). The sample is not to rupture, as evidenced by breaks, tears, rips, or other openings greater than 1/8 inch (3.2 mm) in length; any joining material is to remain intact to the extent that materials such as tapes do not become displaced more than a total for both edges of 1/8 inch (3.2 mm) from their initial position, disregarding movement due to slack or stretch which does not produce a separation of materials; and there is to be no evidence of other damage which results in the samples becoming unusable.

Test Parameters:
 Air ducts and air connector sections of samples previously untested are to be used for the test. Samples, 8 feet (2.43 m) long, are to be used in accordance with 17.2. Air ducts and air connector sections are to be prepared in accordance with 17.3. Each end of the sample is to be sealed airtight by any means consistent with the use of the material under test. In the case of a flexible air duct or air connector, to permit the air duct or air connector to be fully extended to its maximum length, the air duct or air connector is to be pressurized to 0.25 inch water column (62.2 Pa). Each end of the flexible air duct or air connector is to be attached to a stationary fixture. A pressure tap consisting of pipe or tubing is to be sealed into one end of the test sample and connected to a water manometer which shall be read directly to 0.05 inch water column (12.4 Pa). The manometer is to be checked for zero reading at the beginning and at the end of each test. An air supply tap consisting of pipe or tubing is to be sealed into the same or the other end of the sample and connected to a source of air pressure capable of maintaining the specified air pressure in the sample. The manufacturer’s rated pressure is to be gradually attained in not less than 45 seconds nor more than 60 seconds from the initial application of the test pressure. This pressure is to be held for 1 minute. The pressure then is to be increased to 2-1/2 times the manufacturer’s rated pressure in not less than 45 seconds nor more than 60 seconds. The air pressure in the test sample is to be maintained at the designated test pressure for a period of 1 hour.

Rated Positive Pressure on Sample (inches of water column): X 2-1/2 = **see below**

Product (102mm diameter flex duct) Tested at 100 inches of water column per AFS request.

Test Results:			
CONDITIONS	Sample # 1B Yes / No	Sample # 2B Yes / No	Sample # 3B Yes / No
Ruptured	NO	NO	NO
Broken	NO	NO	NO
Torn	NO	NO	NO
Ripped	NO	NO	NO
Joining material displaced greater than 1/8"	NO	NO	NO
Other damage	NO	NO	NO

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To Comply:
 The sample is not to rupture, as evidenced by breaks, tears, rips, or other openings greater than 1/8 inch (3.2 mm) in length; any joining material is to remain intact to the extent that materials such as tapes do not become displaced more than a total for both edges of 1/8 inch (3.2 mm) from their initial position, disregarding movement due to slack or stretch which does not produce a separation of materials; and there is to be no evidence of other damage which results in the samples becoming unusable.

Intertek Comments:

- The product complies with all applicable requirements of this test.
- The product does not comply with the requirements of this test.

Test Date: 4/26/2010

Tested By: J. Curtis *J. Curtis*

Environmental Conditions During Testing: Humidity: 21% Temperature: 73°F

Equipment Used (See page 2 for details): 1 2 4 _____